Chemistry and Technology of Fuels and Oils 2015 vol.51 N1, pages 93-98

Utilization of waste lubricating-cooling fluids by membrane methods

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Abstract

© 2015 Springer Science+Business Media New York. Utilization of waste lubricating-cooling fluids (LCF) cleaned preliminarily by membrane methods is investigated and, based on results of the investigation, an LCF utilization scheme is proposed. The scheme includes the following cleaning stages: coalescence, adsorption, ultrafiltration, nanofiltration, and ion exchange. The first stage is intended for preliminary removal of oil products and suspended matter from the LCF by thin-layer coalescence on polymer plates. In the ultrafiltration stage, oil products, surfactants, and suspended matter are removed by a composite carbon sorbent. Oil products, surfactants, fats, etc. are completely removed, and the mineral content of the water is reduce by roll ultra-nanofiltration membrane elements, and heavy metals are removed from the nanofiltrate by ion-exchange membranes. After the last stage, the cleaned water meets the standards of effluents to be discharged into a drainage system. The overall degree of removal of suspended matter, oil products, surfactants, fats, etc. is 99 % at the outlet.

http://dx.doi.org/10.1007/s10553-015-0579-8

Keywords

Emulsion, Filtration, Lubricating-cooling fluids, Membrane, Waste waters